

(12) UK Patent Application (19) GB (11) 2 040 432 A

(21) Application No 7927790
 (22) Date of filing 9 Aug 1979
 (30) Priority data
 (31) 54/002068
 (32) 10 Jan 1979
 (33) Japan (JP)
 (43) Application published
 28 Aug 1980

(51) INT CL⁷
 F28F 13/08 3/00
 (52) Domestic classification
 F4S 4E2D 4G 4JY 51J
 (56) Documents cited
 GB 2025025A
 GB 1298388
 GB 892021
 GB 567880
 GB 289667

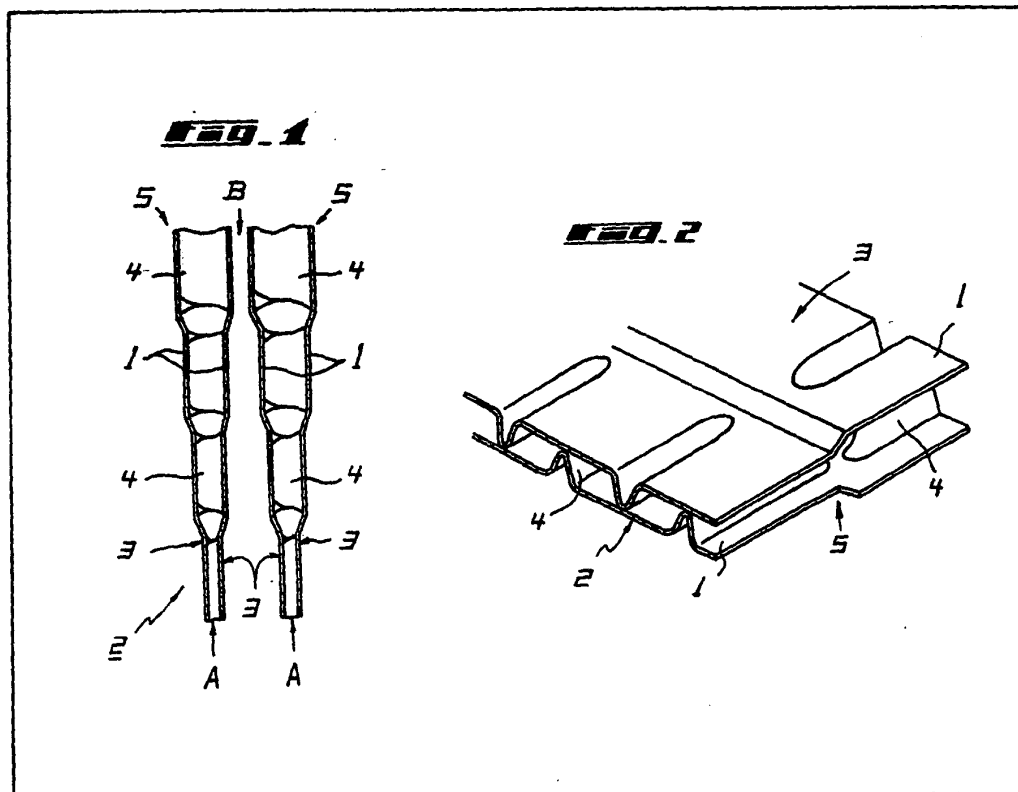
(58) Field of search
 F4S

(71) Applicants
 Kabushiki Kaisha Hisaka
 Seisakusho, No. 4,
 Hiranomachi-4-chome,
 Higashi-ku, Osaka-shi,
 Osaka-fu, Japan

(72) Inventors
 Kenzo Masutani
 Ken'ichi Yamada
 Hiroyuki Sumitomo
 Akira Horiguchi
 (74) Agents
 Reginald W. Barker & Co.

(54) Heat conducting element for
 plate heat exchanger

(57) A heat exchanger plate 1 has ribs 4 projecting therefrom which vary in size in the flow direction A of a fluid passing with a progressive phase change over said plate such that in a unit 2 formed of a plurality of the plates, with the ribs 4 providing support for the plates, the flow path cross-sectional area formed between adjacent plates for said fluid changes in accordance with the degree of phase change in the fluid. As shown, evaporating fluid flowing in direction A exchanges heat with a heating fluid flowing in direction B.



GB 2 040 432 A

CN# 39000
 SDOCID: <GB_2040432A_1>

References

PCT Search
 Report
 11.25

SPECIFICATION

Heat conducting element for plate heat exchanger

5 The present invention relates to a heat conducting element for plate heat exchanger attended with the medium phase change.

In general, heat conducting elements for the plate heat exchanger are provided with medium flow paths whose sectional shapes in the medium flow direction are defined by the shapes of sealing packings and of projections and recesses on the plate. However, the sizes of cross sectional areas along the direction intersecting at right angles with the medium flow direction are all the same throughout the plate surface. So, in the heat exchanger attended with the medium phase change, volume of vapor varies with the change of medium phase in individual sections of the flow path, constituting the drawback that here occurs pressure loss along the direction of phase change. This pressure loss is a cause of resistance of the medium flow as well as of reduction in processing capability and functioning of the heat exchanger.

25 An object of this invention is to provide a heat exchanger excellent in processing capability and function by forming medium flow paths variable in cross sectional area according to the degree of and along the direction of phase change, eliminating the above said drawback in conventional heat conducting elements. Since the sizes of the projecting ribs for supporting the plates of the heat conducting element in the plate heat exchanger attended with the medium phase change are varied along the direction of and according to the degree of phase change for forming medium flow paths variable in cross sectional area according to the degree of phase change by assembling said plates into an element, the processing capability and function of heat exchanger attended with the medium phase change are excellent.

Fig. 1 is a sectional view of a heat conducting element according to the present invention; and,

Fig. 2 is a perspective view of the main part thereof.

In Figs. 1 and 2, the reference numerals (1) and (2) denote a heat conducting plate and a heat conducting element consisting of assembly of said plates, respectively. The heat conducting plate (1) is provided with heat conducting surface (3) whose relative position varies section by section with respect to the standard surface line along the direction of flow of the medium and the plate supporting ribs (4) whose projecting parts vary in size in individual sections. The heat conducting element (2) consists of units (5) arranged in the number as required in row, each unit being composed of confronting ribs (4) (4). Therefore, the medium flow paths A formed between the heat conducting plates (1) (1) of the unit (5) and that B between the units (5) (5) vary in sectional area along the direction of the medium flow.

A further description will be made on the case that

that heat conducting element (2) in such composition as described above is used in the evaporator attended with the medium phase change. For example, evaporating fluid is fed through the path A in the direction from bottom to top as seen in Fig. 1 whereas heating fluid through the path B from top to bottom or vice versa. Evaporating fluid in the path A exchanges heat with heating fluid in the path B through the heat conducting plates (1) (1) and evaporates after heated step by step. The quantity of generating vapor increases with the approach to the lower side. In the conventional heat exchanger, pressure loss occurs with the increase of vapor quantity and approach to the lower side, causing resistance of the medium flow, however, in the flow path in the structure according to the present invention, the sectional area increases with the increase in vapor quantity and can receive and discharge said vapor increasing in quantity. In other words, the processing capability of the flow path A is varied corresponding to the medium phase change, ensuring smooth processing.

85 A technical concept of this invention is not limited to an embodiment described above alone and various embodiments are possible within the scope disclosed in the patent application.

CLAIM

90 A heat conducting element for the plate heat exchanger attended with the medium phase change characterized in that the sizes of projecting ribs for supporting the plate are varied along the direction of and according to the degree of medium phase change, for forming the medium flow paths varying in sectional area according to the degree of phase change by assembling the plates provided with such ribs as above into an element.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd.,
Berwick-upon-Tweed, 1980.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.